

Effect of Dumping on Geotechnical Properties of Soil: A Review

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Abstract - Management and disposal of municipal solid waste (msw) is one of the major environment problem in Indian cities the current practices of the uncontrolled dumping of waste on the outside of the town /cities have created a severe environment and public health problems. The dumping of municipal solid waste case change in the geotechnical properties of the soil and ground water .the focus of the present study is to study the previous research methodology and find out the changes in index properties symptoms character hydraulic conductivity and shear strength properties of soil , this observation change in geotechnical properties maybe useful to carrying out he land development and water quality assessment activist in order to meet the land requirement in urban area the information in this regards is also useful to start further research in this article .

Key Words: Dumping, municipal solid waste, liquid limit, plastic limit, optimum moisture content, maximum dry density.

1. INTRODUCTION

The quantum of municipal solid waste generated is enormous and keeps increasing every year, in metro cities about 50,000 tonnes per day. A concise database containing the estimates on the generation and collection of solid waste s seldom maintained. Studies carried out by NEERI indicate that the per capita generation rate kg/capita/day. The estimated annual increase in per capita generation of solid trip and number of trips made per day. The generated municipal solid waste ncludes residential, commercial, and industrial and hospital waste. They constitute both biodegradable and non biodegradable material like food waste, industrial and commercial plastic, timber, steel, rags and textiles, paper, rubber etc.

The two issues related to the dumping of municipal solid waste are the availability of land for dumping and reclaiming the dumping site for future development. Limited availability of land encourages the uncontrolled dumping waste, on the outskirts of the city causing a serious environmental and public health hazard. The quantity of soil waste generated scarce availability of land and the pollution caused to the soil and groundwater makes the management of municipal solid waste a major challenge in dense urban environment.

2. EARLIER INVESTGATION & SCOPE OF THE STUDY

It is widely recognized that dumping of municipal solid waste on ground has many disadvantages. Uncontrolled

dumping results in severe environment and public health problems. It affects geotechnical properties of soil and water. Many studies have been conducted to find the change in index properties, strength properties and other properties of soil due to dumping at leachate and near by areas. In this paper an effort has been made to review the work already done in the field. So that beginner can easily understand effect of dumping on soil properties and start further research in this particular area

3. NOTEWORTHY CONTRIBUTIONS TO INVESTIGATE THE EFFECT OF DUMPING ON GEOTECHNICAL PROPERTIES OF SOIL.

Many studies have been carried out to evaluate effect of dumping. The brief literature reviews of the latest studies are as follows.

Obbot EEssien et. al, reported that soil at old dump site uyo, excavate to 2m depth shows that liquid limit showed similar value of both sample but plastic limit showed significance different with respect to nearby dump site .

Adamu umar Chinadi et al reported gradual decrease in the unwind strength of specimen permitted with MSW municipal solid waste leachate influence the soil properties which consequently affect the satisfactory performance of sample.

M.A.N Anikni ninvestigated the soil sample for urban agriculture. Author found physio chemical properties and productivity of soil is affected by antinomies uncontrolled dumping of municipal waste.

A run kumar Mehta collected soils sample from dump site in pre-monsoon and post monsoons conditions. Author reported that PH value of soil sample collected in post monsoon season was found to be sympathetic more than the pre mansions sample availability of phosphorus and potassium was found to be more in control soil sample than dump site sample.

Evangalin rum anisinj at et. al, collected soil sample from dumping near by areas and control area. Author Reported specific gravity of soil sample of nearby area was found to be significantly lower than that of central samples which shows pressure of organic content in the soil Author also reported increase in plasticity of soil due to dumping.

Salmatou abdu mahamanu investigated the presence of metals in the urban soil .Author reported that presence of

heavy metal in soil has an impact on the environmental and human health.

M yazdani et. al reported that open dumping is an important cause of soil and land degradation in Iran city.

Amadi A N , et al. , investigated properties of soil sample from dump site and non dump site (control soil samples) author found mean concentration of manganese, lead, iron, PH and bacteria were found to be higher in dump site.

N Raman et.al. Studied the impact of solid waste on ground water near to. Solid wastelandfill soil in Chennai. Author reported pH value of water samples varies from 5.24 to 6.59 not suitable for drinking.

Pillai sifi et.al investigated the property of soil near solid waste disposal site in Kerala author found that specific gravity and plastic limit increase in addition of leachate wherever the hydraulic conductivity and plastic limit decreased.

Hague lu st.al. investigated the adsorption capacity and geotechnical properties of modifying clay containing SSA USD as landfill soil material in China. Study reveals that the modified clay containing SSA can meet the anti seepage and strength requirement of landfill.

G.M Ayininulua examined the impact of leachate from decomposed soil sample at Nigeria . Author reported that the soil properties such as CBR and shear strength at dump site was found better.

4. SIGNIFICANT OBSERVATIONS ON PERFORMANCE CHARACTERISTICS OF CONCRETE REINFORCED WITH HUMAN HAIR.

Nausea st.al. (2011) investigated the effect of leachate on soil below the landfill with respect to pH,OMC,MDD and unconfined compressive strength properties. Author collected distributed sample of various depth from both conditions within the site and outside the site .Author conclude the change in geotechnical properties of the soil differ with the increase in depth because of the few important reason such as effect of leachate, no. Of year of dumping MSW height of MSW dumped and the type of material dumped.

Must alhassion (2012) et. al studied the effect of MSW on geotechnical properties of soil sample taken from the trial pits of depth 0.5,1.0 and 1.5m were used for investigation two trial pits located around the dump site to serve as control point and while the third trial pit located within dump site to serve as contaminated soil, soil sample collected were subjected to specific gravity natural moisture content, particle size analysis, consistency compaction, permeability, triaxial and consolidated tests.

Author reported MSW lower the specific gravity increase the natural moisture content, inverse the fine particle content lower the maximum dry density with higher OMC both lower the cohesion and angle of internal friction increase the coefficients of permeable coefficient of consolidation and coefficient of volume compression of soil with the depths.

5. CONCLUSIONS

In this paper an attempt has been made to analyse and compile the effect of municipal solid waste on geotechnical properties of soil. The following conclusion has been arrived on the basis of research papers reviewed here

1. The specific gravity in the sample is slightly lower than that of control sample showing the presence of organic content in the soil.
2. As per IS classification system, the samples are classified as sandy silt (SM). But it is observed that the dumping has increased the plasticity of soil sample.
3. It was found that generally Municipal solid waste increases the optimum moisture content and lowers the maximum dry density.
4. The compressibility of the soil samples shows a significant increase with an increase in swell index properties and consolidation settlement.
5. Municipal solid waste also lowers the angle of internal friction, increases the coefficient of consolidation and coefficient of volume of compressibility of the soil.

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